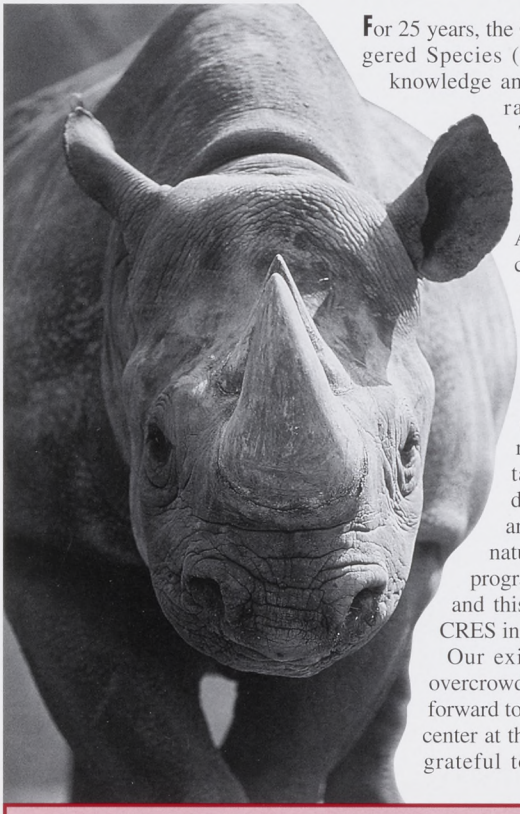
C·R·E·S®
CENTER FOR REPRODUCTION OF ENDANGERED SPECIES

REPORT
WINTER 2000

Committed to Conservation: CRES Strategies for the Future



For 25 years, the Center for Reproduction of Endangered Species (CRES) has expanded scientific knowledge and assisted in the conservation of rare and remarkable animals. Throughout this period, the mainspring for these endeavors has been the Zoological Society's collections at the Zoo and the Wild Animal Park. These are the finest collections of animals and plants in the world, an irreplaceable biological resource. Close working relationships between CRES scientists, curators, and veterinarians have led to successes in breeding cheetahs, African and Indian rhinoceroses, giant pandas, lion-tailed macaques, California condors, and many others. So many animals are now endangered in their natural habitats that captive-breeding programs are essential for their survival, and this will remain a major priority for CRES in the future.

Our existing facility in Balboa Park is overcrowded, however, and we are looking forward to the construction of a new research center at the Wild Animal Park. We are most grateful to those donors who have given

Continued on page 2

Beckman Foundation Challenge Met

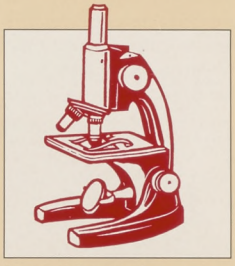
Thanks to the generosity of John and Rebecca Moores, the new CRES center at the Wild Animal Park will become a reality. The plan for a $20 million research center attracted a major investment from the Arnold and Mabel Beckman Foundation, which gave an outright grant of $5 million and issued a matching challenge of $2.5 million earlier this year. When the Zoological Society had received commitments of $950,000 from a number of generous CRES supporters, John Moores stepped forward with $1.45 million to complete the match to the Beckman Foundation's grant. Additionally, the Zoological Society has committed $10 million of its own reserves to complete the funding.

Many thanks to the Beckman Foundation, the Moores family, and all the other CRES supporters who helped make this dream a reality.

CRES® is operated by the Zoological Society of San Diego.



Panda 2000 Conference
Conservation priorities set for the new millennium.
See page 3.



Bonner College Student Research Fellows
Three college students joined CRES for the summer.
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Adopt a Condor for the Holidays!
This is a great gift and a chance to help CRES.
See page 5.

Committed to Conservation: CRES Strategies for the Future

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generously to make this project possible. Work will begin next year on a laboratory complex adjacent to the new Paul Harter Veterinary Medical Center. The eight existing divisions at CRES (Analytical Chemistry, Behavioral Biology, Ecology and Applied Conservation, Endocrinology, Genetics, Pathology, Reproductive Physiology, and Virology/Immunology) will have four times their current allocation of laboratory space. In addition, the Society's nutritionist, Dr. Mark Edwards, will be able to establish his research program in the new building.

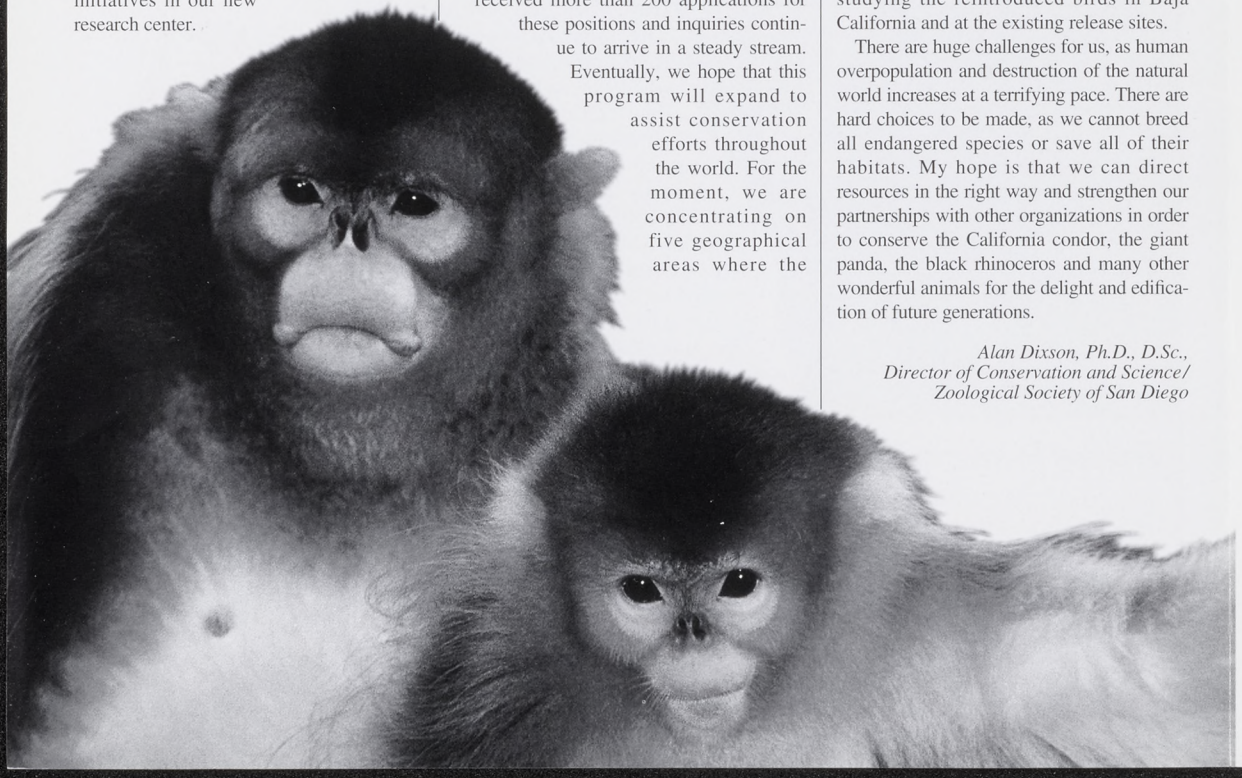
The Society is also searching for a Ph.D.-qualified botanist to join our staff. Many botanical gardens would be proud to possess the rich and varied plant collections that can be seen at the Zoo and Wild Animal Park. It is time to appoint a senior botanist to oversee these collections and direct their future development. We hope that whomever is chosen will play an active role in conservation and science. Laboratory facilities will be available to support these initiatives in our new research center.

In addition to captive-breeding programs and expansion of the CRES laboratories, the Society is also increasing its contributions to the maintenance of biodiversity and survival of endangered species in their natural habitats. This work is vital if we are to avoid the tragedy of having our collections become a "living museum," while the animals and plants we protect cease to exist in the wild. Indeed, it is doubtful whether such a strategy could be maintained in the long term: no ark can stay afloat forever. It is for this reason that the trustees of the Society have approved a new plan to support fieldwork and *in situ* conservation projects on endangered species around the world. This plan will allow young postdoctoral scientists to carry out field projects for three to five years, supported by advisors and collaborators at CRES and in the curatorial, veterinary, and education departments.

Twelve fellowships have been approved by the Society, an enormous commitment to conservation biology that has excited international interest. Since February, we have received more than 200 applications for these positions and inquiries continue to arrive in a steady stream. Eventually, we hope that this program will expand to assist conservation efforts throughout the world. For the moment, we are concentrating on five geographical areas where the Society has particular interests: China, the Pacific Islands, Southwest United States, the Caribbean Islands, and South America. Additionally, we are supporting projects outside these regions that involve "flagship" species of special concern (e.g., rhinoceros species in South Africa and drills in Cameroon). This year the Society has awarded four fellowships for work on golden monkeys (pictured below) in China, Turks and Caicos iguanas in the Caribbean, Peninsula bighorn sheep in California, and owl monkeys in South America. Next year we look forward to initiating projects on the Komodo dragon, the black rhinoceros, the muriqui (woolly spider monkey), and the California condor. The California condor in particular stands as an emblem of the Society's efforts to prevent the extinction of some of the most endangered forms of animal life, to breed them in captivity and restore them to the wild. We hope to release condors in Baja California next year, if a habitat assessment confirms that this area is suitable. Our research fellow will assist in studying the reintroduced birds in Baja California and at the existing release sites.

There are huge challenges for us, as human overpopulation and destruction of the natural world increases at a terrifying pace. There are hard choices to be made, as we cannot breed all endangered species or save all of their habitats. My hope is that we can direct resources in the right way and strengthen our partnerships with other organizations in order to conserve the California condor, the giant panda, the black rhinoceros and many other wonderful animals for the delight and edification of future generations.

Alan Dixson, Ph.D., D.Sc.,
Director of Conservation and Science/
Zoological Society of San Diego

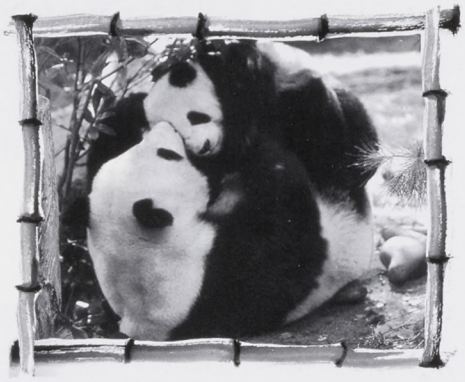


PANDA 2000: Conservation Priorities for the New Millennium

An international conference on the giant panda, held in San Diego during October 15 to 18, brought together many of the top scientists in the field and created a forum for evaluating past goals in giant panda conservation while setting new priorities for future studies. With some 230 registrants attending the meeting, this event provided a forum for 85 presentations on various aspects of panda conservation, captive breeding, and scientific investigations. More than 50 participants attended from China, along with delegates from Japan, Germany, The Netherlands, Switzerland, England, Spain, and Mexico. The conference was jointly organized by CRES, the Zoological Society's research division, and the World Wildlife Fund–U.S., with the China Wildlife Conservation Association and the Chinese Association of Zoological Gardens as co-sponsors.

A series of workshops, panel discussions, and paper sessions were organized around three main themes: (1) issues in the conservation of wild populations of giant pandas; (2) discussion of the role of the captive population in strengthening conservation efforts; and (3) sharing the latest findings in scientific study and management, including work on wild populations and their habitats. In the area of captive populations, major discussions of panda diseases, panda nutritional requirements, and problems in reproductive behavior received attention. The role of zoos in helping to conserve the species, along with a discussion of international coordination and cooperation in panda conservation, were sessions that received a great deal of attention. In the area of field studies, presentations centered on the application of GIS technology to track the movements of individuals, the effects of timber harvesting and fuel wood collection on panda distribution, and the development of conservation-focused management plans for giant panda reserves and adjoining areas. Many more topics proved to be popular, from reviews of the latest work on defining the phylogeny of giant pandas to assessments of extinction risk based on life history traits.

PANDA 2000 set goals to enhance international cooperation in conservation, along with the forging of more direct linkages of captive work with pandas to the conservation effort. A Memorandum of



Consensus signed at the closing session indicates that progress in meeting these goals was achieved. Signing for the Zoological Society of San Diego was Dr. Kurt Benirschke, President of the board of trustees. He was joined in the signing event by Ms. Ginette Hemley, Vice President for Species Conservation with the World Wildlife Fund, Mr. Li Yuming, Vice Secretary General of the China Wildlife Conservation Association, and Mr. Liu Shanghua, President of the Chinese Association of Zoological Gardens.

Six broad areas of agreement were embodied in this consensus:

- increased international cooperation in conservation efforts
- protection of the habitat in the three provinces where giant pandas are found
- support for the updating of China's national conservation plan for giant pandas
- use of data from the current national survey of panda populations in setting strategic conservation plans
- expansion of efforts to increase conservation capacity in China, including the establishment of centers for long-term study of the species
- continued support of scientific research, captive breeding, and population management in order to better understand the giant panda.

Clearly, the conference gave added momentum to initiatives of the past few years, along with indications of new and stronger friendships and an enhanced spirit of cooperation in promoting the shared goal of recovery for the giant panda and its habitat.

Donald G. Lindburg, Ph.D., Head, Office of Giant Panda Conservation/CRES

CRES Grants

The Center for Reproduction of Endangered Species is grateful to the following for their support of imperiled wildlife:

The **Alice C. Tyler Perpetual Trust** has given a grant for genetic and endocrinology studies of the giant panda, rhinoceros, gorilla, and arroyo toad. An **Anonymous** donor gave a grant to purchase GIS (Geographic Information System) equipment, radiotelemetry supplies, and for Southern California habitat restoration programs for the ecology and applied conservation division of CRES. Recent grants in support of the **Arnold and Mabel Beckman Foundation's** challenge grant to construct a new CRES facility at the Wild Animal Park were made by the **Katherine Weaver French Fund**, **Wells Fargo Trustee**, and the **McBeth Foundation**. The **Lakeside Foundation** gave a grant to be applied toward a field study of the owl monkey in Argentina. A grant to purchase equipment for the molecular investigation laboratory in the CRES pathology division was given by the **Steven and Carole Weinberg Foundation**. A grant from the **Woodard Foundation** has been applied toward CRES equipment. The CRES Endowment received support from the **Sahan-Daywi Foundation**. **The Armstrong McDonald Foundation** and the **Bay Foundation** gave grants in support of the CRES reproductive physiology division. The **Strauss Family Foundation** is funding an endocrinology study to benefit the red panda.

Bonner College Student Research Fellows for 2000

Since 1994, a number of promising young scientists have benefited from the Bonner Summer College Student Fellowship Endowment Fund. Jewell H. and James T. Bonner established this fund to sponsor summer interns working on various research projects at CRES that are dedicated to the preservation and protection of wildlife. You can be a part of these endeavors by helping to sponsor one of our CRES summer student fellows. For more information, please call Amy Parrott in the development office at (619) 685-3213.

During the summer of 2000, CRES welcomed three Bonner student fellows. Among them was Tabatha Eatherly from Southern Kentucky University. At CRES, Tabatha joined the genetics division to research the molecular genetics of the histocompatibility (MHC) genes of endangered primate species. She carried out the research in the laboratory of Dr. Oliver Ryder, division head, and was under the supervision of visiting scientist Dr. Simon Lawrance, a professor at Otterbein College in Ohio.

MHC genes, which play important roles in such diverse characteristics as susceptibility to infectious disease, transplantation, and mate choice, are a complex and unusually variable family of genes. These characteristics make their study especially important in conservation biology because this variability may be lost as population sizes diminish. Tabatha successfully determined the nucleic acid sequence of the chimpanzee, gibbon, mandrill, Sumatran and Bornean orangutans, and colobus monkey MHC genes. Her results contribute to our understanding of the evolutionary history of these genes and lay a foundation for efforts to conserve MHC gene diversity in endangered species.


Tabatha Eatherly

Tabatha is a remarkably enthusiastic, independent, and well-disciplined young scientist who gained valuable technical skills in molecular biology during her internship. She and Dr. Lawrance hope to continue their studies during the summer of 2001. We are all looking forward to hearing more from Tabatha Eatherly as she continues to contribute to the world of conservation biology!

Oliver Ryder, Ph.D., Head, Genetics Division/CRES, and Simon Lawrance, Ph.D., Otterbein College

Corinne Taraska came to us from the biology department at Stanford University to assist with our ongoing studies of giant panda behavior. Dr. Ron Swaisgood of the behavior division at CRES provided her with a challenging task. Over the past four years he has collected countless hours of videotape of pandas eating bamboo, in an effort to understand this most interesting of panda behaviors: in the wild, pandas spend 14 hours each day simply eating bamboo. Any observer of this behavior will be impressed with the grace and efficiency with which pandas consume bamboo. If there is one thing pandas are good at, it's eating bamboo. Yet pandas reared in captivity may not possess the same proficiency as their wild counterparts, and that was one of the questions that Swaisgood set out to address.


Corinne Taraska

To do this, he enlisted Corinne's help. The project demanded that someone spend the bulk of her 8-hour day for an entire summer simply watching and decoding videotapes. Corinne was just such a person as she once spent countless hours counting "head bobs" in videotapes of lizards. In the bamboo-feeding study, Corinne had to keep track of minute details of feeding behavior, such as the number of strips the panda peeled off the stem before eating, how many leaves were bunched together to make a leaf wad for consumption, and how many bites and chews it takes to consume a wad. She also had to keep track of how much time the panda spent in these various activities, and which paw it used to hold the bamboo.

This was indeed an arduous task. But the project is well worth it. Now we know more about how pandas manage to consume so much bamboo, how the behavior develops with experience, and how captivity affects this behavior. These data may be used one day to help determine whether captive pandas are behaviorally competent enough to be released back into the wild. After all, an animal that has to eat 14 hours a day to survive can't withstand many deficits in feeding behavior. Thanks, Corinne, for your important contribution.

Ron Swaisgood, Ph.D., Behavior Division/CRES

The endocrinology division's summer intern was Margaret (Meg) Crofoot, a senior undergraduate student from Stanford University. Meg's project was to study the reproduction of the greater Indian hornbill, a large and beautiful bird from Asia. Information on the population numbers in the wild is limited and its reproductive status in captivity is poor, with only one chick hatched last year in the North American captive population; further, there are approximately 80 birds in the aging captive population. This is a species that develops pair bonds, thus the compatible pairing of birds is critical to their breeding success. In collaboration with Michael Mace, curator of birds at the Wild Animal Park, and John Azua, curator of birds from the Denver Zoo, we worked with a number of different zoos holding hornbill pairs.


Margaret Crofoot

Our goal was to monitor the reproductive hormones from these birds throughout the breeding season. Because hormones are excreted in the feces of birds, the necessary samples can be collected each day in a noninvasive manner. Meg analyzed fecal estrogens, androgens, and corticoids to monitor ovarian and testicular changes, as well as any adrenal changes that may be associated with stress. The pair that hatched a chick and two pairs that laid eggs had very similar hormonal profiles for both males and females. Of the other pairs monitored, two pairs showed very low hormone levels.

This information is being used by the Hornbill Species Survival Plan (SSP) to establish recommendations for breeding Indian hornbills. As a result of this study, the pair with more normal hormone profiles is being transferred to a zoo with warmer weather conditions and which has had success in reproducing hornbills. The SSP is very interested in continuing this project, so we are planning to collect samples from additional birds, in order to better understand the biology of this species and gather information on the hornbill pairs' reproductive potential. This is the first hormonal study on male and female Indian hornbills, and it has demonstrated that the noninvasive monitoring of reproduction can be achieved using fecal hormones. Meg's study was very successful, and we wish her the best in her future work.

Nancy Czekala, Endocrinology Specialist/CRES

Adopt a Condor and Chick for the Holidays!



Fly high this holiday season with one of the most unique gifts to be found, while also helping endangered species. The Adopt-An-Animal Program helps support the research of our dedicated scientists at the Center for Reproduction of Endangered Species (CRES), in their quest to study endangered animals and their habitats. This year, our focus is on the California condor, which also appears on the CRES logo.

During the late Pleistocene epoch (2.5 million years ago), the California condors were found from British Columbia to Baja California, across the southern United States to Florida, and as far as New York on the East Coast. Biologists believe that with the extinction of the large mammals that provided an abundant food source, the condors' range was restricted to the West Coast.

Throughout the last century, the California condor population was in decline, and in 1987, the few remaining wild condors were taken into captivity to save the species. These founder birds were taken to the San Diego Wild Animal Park and the Los Angeles Zoo, where intensive breeding programs were begun. From these original birds, there is now a population of more than 150, of which 50 are flying free in protected areas in California and Arizona.

You can visit these majestic birds at the new Condor Ridge exhibit at the San Diego Wild Animal Park. Help support CRES and the condors with a holiday gift that will keep their future alive.

With your adoption package of $99 you can choose:

PACKAGE 1

- **11-inch plush toy adult condor with chick**
- **Adoption certificate**
- **Subscription to *CRES Report***
- **Gift card**

AND

- **Two complimentary guest passes to the San Diego Zoo or the San Diego Wild Animal Park**

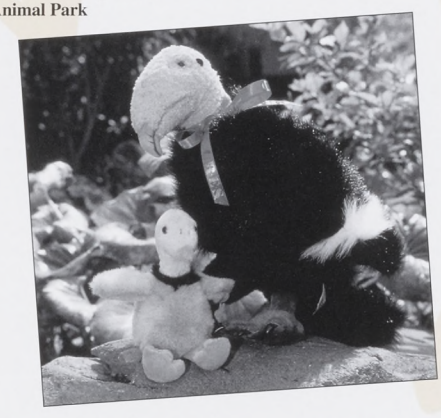
or

PACKAGE 2

- **11-inch plush toy adult condor with chick**
- **Adoption certificate**
- **Subscription to *CRES Report***
- **Gift card**

AND

- **Custom desk clock with CRES logo**



To order a gift adoption package, please call (619)231-1515, ext. 4199. Holiday and Valentine Adoption Programs will be discontinued in 2001.

ANIMAL ADOPTION APPLICATION

❑ **YES,** I want to adopt a condor & chick for:

Choose: ❑ *PACKAGE 1* *or* ❑ *PACKAGE 2*

(Please print clearly for certificate.)

Name(s) _____

Address _____

City _____ State ____ Zip _____

Gift Card To: _____

From: _____

Additional condor & chick adoption, *choose:* ❑ *PACKAGE 1* *or* ❑ *PACKAGE 2*

Name(s) _____

Address _____

City _____ State ____ Zip _____

Gift Card To: _____

From: _____

Additional condor & chick adoption, *choose:* ❑ *PACKAGE 1* *or* ❑ *PACKAGE 2*

Name(s) _____

Address _____

City _____ State ____ Zip _____

Gift Card To: _____

From: _____

Please make checks payable to the Zoological Society of San Diego and mail to: The Zoological Society of San Diego, Adopt-An-Animal Program, P.O. Box 120271, San Diego, CA 92112.

OR, please charge my: ❑ MasterCard® ❑ VISA® ❑ Discover®

Card # _____ Exp. Date _____

Signature _____

Donor Name (print) _____

Daytime Phone # _____

OR, you may charge your adoption by telephone: call (619) 231-1515, ext. 4199, between 8 A.M. and 4 P.M., Monday through Friday.

Orders must reach the San Diego Zoo by December 15 to ensure delivery by Christmas.

(AHDM01)

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Girl Scouts Recycle for CRES!





Susan Kahakui

Brownie Troop 4239 shows its enthusiasm for the Cans for Critters recycling drive.

Hats go off to the 2,500 Girl Scouts who participated in the Third Annual Girl Scout Cans for Critters Drive. More than 250 troops joined the recycling drive and collectively recycled more than 16,000 pounds of aluminum equal to 512,000 CANS! More than 2,000 badges were awarded to those Girl Scouts who collected 200 or more cans. Participants were thanked and top collectors honored at the Girl Scout Jamboree on November 11, 2000. A special sea lion show at the Zoo was held for Girl Scouts to thank them for their participation in the program and to recognize their hard work. The proceeds from the recycling were donated to CRES.

If your troop, school, or organization would like to be a part of the Cans for Critters recycling program, please call Tamara Langmead at (619)744-3362.

CRES REPORT®
CENTER FOR REPRODUCTION OF ENDANGERED SPECIES

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SAN DIEGO ZOO
SAN DIEGO WILD ANIMAL PARK

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